AMENDMENTS TO THE CLAIMS

Pursuant to 37 C.F.R. § 1.121 the following listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) A method for detection of QRS complex in an ECG signal, the method comprising the steps of:

correlating a QRS complex template with a continuous-in-time ECG signal of a patient to produce a correlation output, the QRS complex template representative of a shape in time unique to QRS complex in a set of QRS complexes for the patient;

determining a threshold that when exceeded by the correlation output indicates that the continuous-in-time ECG signal substantially correlates with the QRS complex template; and

correlating a real-time ECG signal of the patient with the QRS complex template.

2. (Previously presented) The method as set forth in claim 1, further comprising the step of:

receiving the real-time ECG signal from an ECG test probe attached at one end to the patient and at the other end to an ECG machine.

3. (Previously presented) The method as set forth in claim 1, further comprising the step of:

indicating on a display of voltage versus time, the shape in time unique to the QRS complex in said set of QRS complexes in the patient, the shape in time comprising a Q peak, an R peak, and an S peak of the QRS complex.

4. (Previously presented) The method as set forth in claim 1, wherein the step of correlating a QRS complex template with a continuous-in-time ECG signal of a patient further comprises the step of:

superimposing the QRS complex template over the continuous-in-time ECG signal.

5. (Previously presented) The method as set forth in claim 4, wherein the superimposing step further comprises the step of:

continuously shifting forward in time the superimposed QRS complex template over the continuous-in-time ECG signal.

6. (Previously presented) The method as set forth in claim 1, wherein the determining step further comprises the steps of:

assigning a high correlation value when during a particular window of time the QRS complex template substantially correlates with the continuous-in-time ECG signal; and

assigning a low correlation value when during a particular window of time there is an absence of a substantially close correlation of the QRS complex template with the continuous-in-time ECG signal.

7. (Previously presented) The method as set forth in claim 6, wherein the determining step further comprises the step of:

continuously shifting forward in time the window of time.

8. (Previously presented) The method as set forth in claim 1, wherein the step of correlating a real-time ECG signal of the patient with the QRS complex template further comprises the step of:

superimposing the QRS complex template over the real-time ECG signal.

9. (Previously presented) The method as set forth in claim 8, wherein the superimposing step further comprises the step of:

continuously shifting forward in time the superimposed QRS complex template over the real-time ECG signal.

10. (Previously presented) The method as set forth in claim 40, wherein prior to the initiating step a MRI machine receives a trigger pulse indicating an initiation of a prescribed MRI data acquisition.

11. (Previously presented) The method as set forth in claim 40, wherein the prescribed MRI data acquisition comprises at least one of:

updating a type of data being acquired and, initiating an initiation of a data acquisition process.

12. (Currently Amended) A method for detection of QRS complex in an ECG signal for a patient, the method comprising the steps of:

correlating a QRS complex template with each continuous-in-time ECG signal received from a set of ECG channels of a patient to produce a respective correlation output for each ECG

channel, the QRS complex template representative of a shape in time unique to a QRS complex in a set of QRS complexes for the patient;

assigning a weighted score for each ECG channel indicative of a strength of the respective correlation output of the QRS complex template with the continuous-in-time ECG signal for a particular ECG channel in said set of ECG channels;

determining a threshold that when exceeded by the correlation outputs indicates that the continuous-in-time ECG signal correlates with the QRS complex template, the threshold being a combined value of each continuous-in-time ECG signal in said set of ECG channels, and the contribution of each ECG channel to the threshold being proportionate to the assigned weighted score for each ECG channel;

correlating the QRS complex template for each ECG channel in said set of ECG channels with a real-time ECG signal for each ECG channel in said set of ECG channels of the patient; and

combining the ~~correlations~~ correlation outputs for each ECG channel in said set of ECG channels, the contribution of each ECG channel to the combined correlation being proportionate to the weighted score assigned to each ECG channel.

13. (Previously presented) The method as set forth in claim 12, wherein the step of correlating a QRS complex template with each continuous-in-time ECG signal received from a set of ECG channels of a patient further comprises the step of:

choosing a window of time for the correlation of QRS template with the continuous-in-time ECG signal in a single ECG channel that is representative of a window of time at which QRS complex generally occurs in the remaining ECG channels.

14. (Previously presented) The method as set forth in claim 12, wherein the assigning step further comprises the steps of:

associating a higher weighted score for an ECG channel having a stronger correlation of the QRS complex template with the continuous-in-time ECG signal; and

associating a lower weighted score for an ECG channel having a weaker correlation of the QRS complex template with the continuous-in-time ECG signal.

15. (Previously presented) The method as set forth in claim 12, wherein the threshold comprises an overall threshold for each ECG channel, and individual thresholds contribute to the overall threshold in proportion to the weighted score associated with each ECG channel.

16. (Currently Amended) A method for detection of QRS complex in an ECG signal for a patient, the method comprising the steps of:

determining a QRS complex template having a shape in time representative of an average shape in time of QRS complex in a set of QRS complexes in an ECG signal for a patient;

correlating the QRS complex template with a continuous-in-time ECG signal of the patient to produce a correlation output;

determining a threshold that when exceeded by the correlation output indicates that the continuous-in-time ECG signal correlates with the QRS complex template; and

correlating a real-time ECG signal from the patient with the QRS complex template.

17. (Previously presented) The method as set forth in claim 16, wherein the step of correlating the QRS complex template with a continuous-in-time ECG signal of the patient further comprises the step of:

superimposing the QRS complex template over the continuous-in-time ECG signal sample.

18. (Previously presented) The method as set forth in claim 17, wherein the superimposing step further comprises:

continuously shifting forward in time the superimposed QRS complex template over the continuous-in-time ECG signal sample.

19. (Previously presented) The method as set forth in claim 16, wherein the step of determining a threshold further comprises the steps of:

assigning a high correlation value when during a particular window of time the QRS complex template substantially correlates with the continuous-in-time ECG signal; and

assigning a low correlation value when during a particular window of time there is an absence of a substantially close correlation of the QRS complex template with the continuous-in-time ECG signal.

20. (Previously presented) The method as set forth in claim 19, wherein the window of time continuously shifts.

21. (Previously presented) The method as set forth in claim 16, wherein the step of correlating a real-time ECG signal from the patient with the QRS complex template further comprises the step of:

superimposing the QRS complex template over the real-time ECG signal of the patient.

22. (Previously presented) The method as set forth in claim 21, wherein the superimposing step further comprises:

continuously shifting forward in time the superimposed QRS complex template over the real-time ECG signal.

23. (Previously presented) The method as set forth in claim 42, further comprising the step of:

prior to the initiating step, receiving a trigger pulse which indicates a time at which to initiate the initiation of the prescribed MRI data acquisition.

24. (Previously presented) The method as set forth in claim 42, wherein the prescribed MRI data acquisition comprises at least one of an update of a type of data being acquired and an initiation of a data acquisition process.

25. (Currently amended) A computer system for detecting a QRS complex, the computer system comprising:

a memory; and

a processor interconnected with the memory and having at least one software component loaded therein,

wherein the software component causes the processor to execute the following steps: ~~of method according to claim 1.~~

correlating a QRS complex template with a continuous-in-time ECG signal of a patient to produce a correlation output, the QRS complex template representative of a shape in time unique to QRS complex in a set of QRS complexes for the patient;

determining a threshold that when exceeded by the correlation output indicates that the continuous-in-time ECG signal substantially correlates with the QRS complex template; and

correlating a real-time ECG signal of the patient with the QRS complex template.

26. (Currently amended) A computer program product comprising a computer readable medium having a software component encoded thereon in computer readable form, wherein the software component may be loaded into a memory of a computer system and cause a processor interconnected with the memory to execute the following steps: ~~of method according to claim 1.~~

correlating a QRS complex template with a continuous-in-time ECG signal of a patient to produce a correlation output, the QRS complex template representative of a shape in time unique to QRS complex in a set of QRS complexes for the patient;

determining a threshold that when exceeded by the correlation output indicates that the continuous-in-time ECG signal substantially correlates with the QRS complex template; and

correlating a real-time ECG signal of the patient with the QRS complex template.

27. (Cancelled)

28. (Currently amended) A method for correlation of a real-time ECG signal of a patient with a predescribed template, comprising the steps of:

correlating a predescribed template with a continuous-in-time ECG signal of a patient to produce a correlation output, the predescribed template representative of a time course unique to a subsection of the ECG signal for the patient in a series of subsections of the ECG signal for the patient;

determining a threshold that when exceeded by the correlation output indicates that the continuous-in-time ECG signal substantially correlates with the predescribed template;

correlating a real-time ECG signal of the patient with the predescribed template.

29. (Previously presented) The method as set forth in claim 28, further comprising the step of:

initiating automatically a prescribed MRI data acquisition when the correlation of the real-time ECG signal with the predescribed template exceeds the threshold.

30. (Previously presented) The method as set forth in claim 28, further comprising the step of:

determining the time course unique to the subsection of the ECG signal from a visual display of the ECG signal.

31. (Previously presented) The method as set forth in claim 28, wherein the step of correlating a predescribed template with a continuous-in-time ECG signal of a patient further comprises the step of:

superimposing the predescribed template over the continuous-in-time ECG signal.

32. (Previously presented) The method as set forth in claim 31, wherein the superimposing step further comprises the step of:

continuously shifting forward in time the superimposed predescribed template over the continuous-in-time ECG signal.

33. (Previously presented) The method as set forth in claim 28, wherein the determining step further comprises:

assigning a high correlation value when during a particular temporal segment the predescribed template substantially correlates with the continuous-in-time ECG signal; and

assigning a low correlation value when during a particular temporal segment there is an absence of a substantially close correlation of the predescribed template with the continuous-in-time ECG signal.

34. (Previously presented) The method as set forth in claim 28, wherein the step of correlating a real-time ECG signal of the patient with the predescribed template further comprises the step of:

superimposing the predescribed template over the real-time ECG signal from the patient undergoing MRI.

35. (Previously presented) The method as set forth in claim 34, wherein the superimposing step further comprises the step of:

continuously shifting forward in time the superimposed predescribed template over the real-time ECG signal.

36. (Currently Amended) A method for correlation of a real-time ECG signal of a patient with a predescribed template, the method comprising the steps of:

correlating a predescribed template with each continuous-in-time ECG signal received from a set of ECG channels of a patient to produce a respective correlation output for each ECG channel, the predescribed template representative of a time course unique to a subsection of the continuous-in-time ECG signal for the patient;

assigning a weighted score for each ECG channel indicative of a strength of the respective correlation output of the predescribed template with the continuous-in-time ECG signal for a particular ECG channel in said set of ECG channels;

determining a threshold that when exceeded by the correlation outputs indicates that the continuous-in-time ECG signal correlates with the predescribed template, the threshold being a combined value for each continuous-in-time ECG signal in said set of ECG channels, the contribution of each ECG channel to the threshold being proportionate to a weighted score assigned to each ECG channel;

correlating the predescribed template for each ECG channel in said set of ECG channels with a real-time ECG signal for each ECG channel in said set of ECG channels of the patient; and

combining the ~~correlations~~ correlation outputs for each ECG channel in said set of ECG channels, the contribution of each ECG channel to the combined correlation proportionate to the weighted score assigned to each ECG channel.

37. (Previously presented) The method as set forth in claim 36, wherein the step of correlating a predescribed template with each continuous-in-time ECG signal received from a set of ECG channels of a patient further comprises the step of:

choosing a temporal segment for the correlation of predescribed template with the continuous-in-time ECG signal in a single ECG channel which clearly depicts the time course unique to the subsection of the continuous-in-time ECG signal.

38. (Previously presented) The method as set forth in claim 36, wherein the assigning step further comprises:

associating a higher weighted score for an ECG channel having a stronger correlation of the predescribed template with the continuous-in-time ECG signal; and

associating a lower weighted score for an ECG channel having a weaker correlation of the predescribed template with the continuous-in-time ECG signal.

39. (Previously presented) The method as set forth in claim 38, wherein the threshold comprises an overall threshold for each ECG channel, and individual thresholds of each ECG channel contribute to the overall threshold in proportion to the weighted score associated with each ECG channel.

40. (New) The method as set forth in claim 1, the method further comprising the step of automatically initiating a prescribed MRI data acquisition at a point in time when the correlation of the real-time ECG signal with the QRS complex template exceeds the threshold.

41. (New) The method as set forth in claim 1, wherein the step of correlating a real-time ECG signal of the patient with the QRS complex template occurs while the patient is undergoing MRI.

42. (New) The method as set forth in claim 12, the method further comprising the step of automatically initiating a prescribed MRI data acquisition at a point in time when the combined correlation exceeds the threshold.

43. (New) The method as set forth in claim 12, wherein the step of correlating the QRS complex template for each ECG channel in said set of ECG channels with a real-time ECG signal for each ECG channel in said set of ECG channels occurs while the patient is undergoing MRI.

44. (New) The method as set forth in claim 16, the method further comprising the step of automatically initiating a prescribed MRI data acquisition at a point in time when the correlation of the real-time ECG signal with the QRS complex template exceeds the threshold.

45. (New) The method as set forth in claim 16, wherein the step of correlating a real-time ECG signal of the patient with the QRS complex template occurs while the patient is undergoing MRI.

46. (New) The method as set forth in claim 36, the method further comprising the step of automatically initiating a prescribed MRI data acquisition at a point in time when the combined correlation exceeds the threshold.

47. (New) The method as set forth in claim 36, wherein the step of correlating the predescribed template for each ECG channel in said set of ECG channels with a real-time ECG signal for each ECG channel in said set of ECG channels of the patient occurs while the patient is undergoing MRI.

48. (Withdrawn-currently amended) A method for detection of at least one of a P-wave and a T-wave in an ECG signal, the method comprising the steps of:

correlating at least one of a P-wave template and a T-wave template with a continuous-in-time ECG signal of a patient to produce a correlation output, the template representative of a shape in time unique to a respective wave in a set of respective waves for the patient;

determining a threshold that when exceeded by the correlation output indicates that the continuous-in-time ECG signal substantially correlates with the template; and

correlating a real-time ECG signal of the patient with the template.

49. (Withdrawn) The method as set forth in claim 48, further comprising the step of:

automatically initiating a prescribed MRI data acquisition at a point in time when the correlation of the real-time ECG signal with the template exceeds the threshold.

50. (Withdrawn – currently amended) A method for detection of at least one of a P-wave and a T-wave in an ECG signal for a patient, the method comprising the steps of:

correlating at least one of a P-wave template and a T-wave template with each continuous-in-time ECG signal received from a set of ECG channels of a patient to produce a respective correlation output for each ECG channel, the template representative of a shape in time unique to a respective wave in a set of respective waves for the patient;

assigning a weighted score for each ECG channel indicative of a strength of the respective correlation output of the template with the continuous-in-time ECG signal for a particular ECG channel in said set of ECG channels;

determining a threshold that when exceeded by the correlation outputs indicates that the continuous-in-time ECG signal correlates with the template, the threshold being a combined value of each continuous-in-time ECG signal in said set of ECG channels, and the contribution of each ECG channel to the threshold being proportionate to the assigned weighted score for each ECG channel;

correlating the template for each ECG channel in said set of ECG channels with a real-time ECG signal for each ECG channel in said set of ECG channels of the patient; and

combining the ~~correlations~~ correlation outputs for each ECG channel in said set of ECG channels, the contribution of each ECG channel to the combined correlation being proportionate to the weighted score assigned to each ECG channel.

51. (Withdrawn) The method as set forth in claim 50, further comprising the step of:

automatically initiating a prescribed MRI data acquisition at a point in time when the combined correlation exceeds the threshold.

52. (Withdrawn – currently amended) A method for detection of at least one of a P-wave and a T-wave in an ECG signal for a patient, the method comprising the steps of:

determining at least one of a P-wave template and a T-wave template having a shape in time representative of an average shape in time of a respective wave in a set of respective waves in an ECG signal for a patient;

correlating the template with a continuous-in-time ECG signal of the patient to produce a correlation output;

determining a threshold that when exceeded by the correlation output indicates that the continuous-in-time ECG signal correlates with the template; and

correlating a real-time ECG signal from the patient with the template.

53. (Withdrawn) The method as set forth in claim 52, further comprising the step of:

automatically initiating a prescribed MRI data acquisition at a point in time when the correlation of the real-time ECG signal with the P-wave template exceeds the threshold.

54. (Withdrawn) The method as set forth in claim 28, wherein the predescribed template is at least one of a QRS complex, a P-wave, and a T-wave.

55. (Withdrawn) The method as set forth in claim 36, wherein the predescribed template is at least one of a QRS complex, a P-wave, and a T-wave.